

**From:** Dellinger, Philip  
**Sent:** Tuesday, December 10, 2013 11:04 AM  
**To:** R6 6WQ-SG;Dwyer, Stacey  
**Subject:** FW: EARTHQUAKES: Stronger quakes shake Okla., Texas over the weekend

FYI

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**From:** Casso, Ruben  
**Sent:** Tuesday, December 10, 2013 10:56 AM  
**To:** Lawrence, Rob; Dellinger, Philip  
**Subject:** EARTHQUAKES: Stronger quakes shake Okla., Texas over the weekend

## **EARTHQUAKES: Stronger quakes shake Okla., Texas over the weekend**

Mike Soraghan, E&E reporter  
Published: Tuesday, December 10, 2013

Two areas where scientists suspect oil and gas activities may be causing earthquakes had some of their strongest shaking yet during the weekend.

A magnitude-4.5 quake struck shortly after noon Saturday near Oklahoma City, where the "Jones swarm" has been producing smaller earthquakes for years. And a magnitude-3.6 rupture shook the far edge of the Fort Worth, Texas, suburbs shortly after midnight Sunday. There were no reports of major damage from either quake.

Oklahoma has seen a dramatic increase in earthquakes since 2009 and ranks second among the lower 48 states for the number of quakes during that time, after California ([EnergyWire](#), Dec. 2).

Research by seismologists from Cornell and Columbia universities pointed to oil and gas production as a possible cause of the Jones swarm.

But the Oklahoma Geological Survey has pointed to heavy rainfall in April filling nearby Arcadia Lake as a possible reason for an uptick in the Jones swarm that started in October.

The quake near Arcadia, Okla., was large enough to merit some national news coverage. Several sports outlets noted that the quake occurred as a kicker for Oklahoma State University attempted a field goal in its football game against the University of Oklahoma. The kicker made the field goal, but OSU still lost.

The earthquakes around Azle, Texas, northwest of Fort Worth, had appeared to be tapering off since a magnitude-3.6 quake Nov. 20. But the overnight quake Sunday indicated that may not be the case. Then a magnitude-3.7 quake hit early yesterday morning about 29 miles west, near Perrin.

Researchers at Southern Methodist University are planning to install portable seismic recorders from the U.S. Geological Survey around Azle as early as this week. The university announced yesterday that the team will also deploy a group of 15 sensors from the Incorporated Research Institutions for Seismology's Program for Array Seismic Studies of the Continental Lithosphere and four or five broadband instruments from other sources. The additional monitors will allow researchers to study a broader area.

"We are first going to focus in on where the earthquakes have been occurring -- about a 5- to 6-mile area near Reno and Azle," said Heather DeShon, the geophysics professor leading the effort. "How long the monitors remain depends on continued seismicity. We're thinking a few months."

Seismologists say the first step in figuring out whether the earthquakes are man-made would be getting more accurate locations for the epicenters of the quakes. The closest monitoring instrument is about 60 miles from Azle, so the locations being provided by USGS aren't very precise.

Oklahoma and Texas are in the midst of a drilling boom fueled by horizontal drilling and hydraulic fracturing, or fracking, which uses a high-pressure mix of water, sand and chemicals to break open rocks. Fracking itself isn't thought to cause most earthquakes, but it produces a large amount of wastewater that drillers typically get rid of using deep underground injection wells. The wastewater can lubricate an existing fault, causing an earthquake, researchers have said